

REMARKS

This Supplemental Amendment and the following remarks respond to the Office Action mailed June 28, 2007. In addition, this Amendment and the following remarks are made in response to the in person interview conducted on December 14, 2007. The remarks made in this amendment are intended to replace the remarks made in Applicants' previous response filed on November 28, 2007. Applicants withdraw all remarks made in the previous Amendment filed on November 28, 2007 that are not reproduced or incorporated by reference in the current Amendment. Claims 1-28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gupta et al., US Patent No. 6,438,562, hereinafter "Gupta," in view of Blank et al., US Patent No. 5,842,208, hereinafter "Blank."

Reconsideration of these rejections, as they might apply to the original and amended claims in view of these remarks, is respectfully requested.

In this Response, claims 1, 10, 14, 18, 20, and 24 have been amended, claims 27 and 28 have been cancelled, and no claims have been added. Therefore, claims 1-26 remain present for examination.

Summary of Interview

Applicants would like to thank Examiner Pham for his comments during the in person interview conducted on December 14, 2007. During the interview, Examiner Pham and the Applicants' representative discussed the Gupta and Blank references and possible claim amendments. Examiner Pham agreed that the previous amendments overcome the § 101 rejection for the reasons stated in Applicants response filed on November 28, 2007. No agreement was reached with respect to the §103 rejection of claims 1-28 over Gupta in view of Blank.

Claim Rejections – 35 U.S.C. § 101

As discussed, the Examiner agreed that Applicants' Amendment of November 28, 2007 overcame the rejections of the pending claims under § 101.

Claim Rejections – 35 U.S.C. § 103(a)

Claims 1-26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gupta in view of Blank. Applicants respectfully traverse the § 103(a) rejections because either the Examiner failed to state a *prima facie* case of obviousness or the current amendments to the claims now render the Examiner's arguments moot. To establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), the references must teach or suggest all of the claimed limitations to one of ordinary skill in the art at the time the invention was made. M.P.E.P §§ 2142, 2143.03; *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974); *In re Wilson*, 424 F.2d 1382, 1385 (C.C.P.A. 1970). Further, under *KSR Int'l Co. v. Teleflex, Inc.*, there "must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." 127 S. Ct. 1727, 1741 (2007). Neither Gupta nor Blank, either separately or in combination, teach or suggest all of the limitations of the recited claims.

Gupta relates to "a method, system, and product for coordinating parallel update for a global index of and indexed table." (Gupta, Abstract). "Techniques for maintaining a global index of a table during parallel data manipulations operations involve a coordinator process, data manipulation slaves and index update slaves. The coordinator process *distributes* data manipulation operations among a plurality of data manipulation slaves." (*Id.*, col. 8, ll. 1-6) (emphasis added). Gupta teaches a method using parallel DML ("PDML") operations that accomplishes the "need to update a global index as a result of PDML operations without suffering the deficiencies of lost clustering, or contention for the same block, the latter leading to excessive waits or block pinging." (*See id.*, col. 7, ll. 35-38).

Gupta teaches sorting maintenance records and determining a range by reading key values from the sorted maintenance records. (*See id.*, col. 15, ll. 35-67). A coordinator process then uses these ranges in distributing records to multiple slave processes. (*See id.*, col. 14, ll. 9-14). The slave processes use the maintenance records distributed by the coordinator process to update a global index. (*See id.*, col. 14, ll. 16-20).

Gupta fails to teach or suggest at least determining partition delimiters, each partition delimiter separating the table into non-overlapping partitions of records, each partition dedicated to one processing unit for index creation, wherein the step of determining comprises sampling the database table of records to determine an approximate distribution of at least one key value in the records; accessing the table records in parallel, wherein each processing unit accesses each of the records, wherein the step of accessing occurs after the step of determining; and filtering the accessed records in parallel, wherein each processing unit determines which records to keep, as recited in independent claim 1. As noted above, Gupta teaches updating a global index using multiple slave processes. In order to update the index, a coordinator process determines ranges for a set of maintenance records (a set of records that have been updated). The coordinator process then assigns the different ranges to various slave processes. After assigning the range, the coordinator process *distributes the maintenance records* to each slave process such that *each slave process receives only the maintenance records that fall within its assigned range*. (See Gupta, col. 14, ll. 9-20). Upon receiving the maintenance records, the slave processes use the maintenance records to update a global index. The teachings of Gupta require a great amount of work by the coordinator process to distribute maintenance records to each slave process.

Conversely, claim 1 describes determining partition delimiters, each partition delimiter separating the table into non-overlapping partitions of records, each partition dedicated to one processing unit for index creation, wherein the step of determining comprises sampling the database table of records to determine an approximate distribution of at least one key value in the records. After sampling the database to determine an approximate distribution used in determining partition delimiters, each processor undertakes the steps of accessing the table records in parallel, wherein each processing unit accesses each of the records and filtering the accessed records in parallel, wherein each processing unit determines which records to keep. The embodiment recited in claim 1 recites parallel index creation in which an entire table, not just maintenance records, can be indexed without having to undertake the effort of a coordinated distribution of records as taught in Gupta. The *single* coordinator process providing specific maintenance records to each of the multiple slaves is not the same as each processing unit accesses each of the records. There is no suggestion in Gupta that each of the slaves accesses each record in the table. Rather, each slave process in Gupta receives only the maintenance records within its range. This is fundamentally different from the approach of the method

described in claim 1 wherein each processing unit accesses each record, thereby eliminating the need for a coordinator process or other process to provide only the records within a partition to each processing unit.

Blank does not compensate for this deficiency. Blank relates to a “recover/build index system [that] builds an index for a file by scanning partitions of the file in parallel to retrieve key/rid values. The recover/build index system then sorts the scanned key/rid values for each partition in parallel.” (col. 1, ll. 37-41). After the data is sorted in parallel, a “merge program merges the sort streams received from the sort programs to create a merge stream. The merge program accepts the sort stream from two or more sort programs. The merge program then passes the merge stream to an index build program.” (col. 3, ll. 10-14). Thus, Blank teaches a method where a parallel sort is merged via combining the data streams produced by two or more sorts into a single data stream. Blank then performs *index creation on this single data stream*.

Blank does not teach determining partition delimiters, each partition delimiter separating the table into non-overlapping partitions of records, each partition dedicated to one processing unit for index creation, wherein the step of determining comprises sampling the database table of records to determine an approximate distribution of at least one key value in the records, as recited in claim 1. Indeed, Blank only indexes the single data stream because it fails to teach or suggest this step. Because no pre-sampling of data to determine non-overlapping partitions is taught in Blank, the individual sort streams *must* be merged *before* an index is created.

Furthermore, while multiple processing units are taught in Blank, the reference also teaches that each processing unit accesses only a portion of the table, i.e., each processing unit scans a single partition. Blank teaches,

[t]he scan programs **108** executing in parallel extract key values (of a particular key) and record identifiers (rids) or pointers from the partitions **120** to create a key/rid or scan stream *for each partition 112*. (Blank, col. 2, l. 64 – col. 3, l.1) (emphasis added).

The scan programs in Blank are only assigned a particular partition of the table, not each of the records in the table. Thus, Blank also fails to teach or suggest accessing the table records

in parallel and filtering the accessed records in parallel, wherein each processing unit determines which records to keep.

In any event, it would be improper to combine the parallel scan and sort taught by Blank with the system of Gupta. There “must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007). Gupta is predicated on a central process or other process providing specific, partitioned records to slave processes. There is simply no need in Gupta for a parallel scan or sort by the slave process. In fact, Gupta specifically teaches away from using parallel processes to access *each record*:

“Because each slave has a non-overlapping range, there is little or no contention for the same leaf block – thus latch contention and block pinging are drastically reduced.” (Gupta, col. 14, ll. 20-23).

For at least these reasons, claim 1 is allowable over the cited references and Applicants respectfully request that the Examiner issue a notice of allowance.

For at least similar reasons, both Gupta and Blank also fail to teach or suggest the other independent claims. For example, independent claim 14 recites, *inter alia*,

a partition tool that determines partition delimiters, each partition delimiter separating the table into non-overlapping partitions of records, each partition dedicated to one processing unit for index creation, wherein the step of determining comprises sampling the database table of records to determine an approximate distribution of at least one key value in the records;

a plurality of processing units that respectively accesses the database table in parallel, wherein each of the respective processing units accesses each of the records and filters the accessed records to determine which records to keep and wherein each of the respective processing units creates a sub-index of database table records resulting in a plurality of sub-indexes. . . .

Independent claim 18 recites, *inter alia*,

determining partition delimiters, each partition delimiter separating the table into non-overlapping partitions of records, wherein the step of determining comprises sampling the database table of records to determine an approximate distribution of at least one key value in the records, and wherein at least one partition is dedicated to a first processing unit for index creation and at least one other partition is dedicated a second processing unit for index creation. . . .

Independent claim 20 recites, *inter alia*,

determining partition delimiters, each partition delimiter separating the table into non-overlapping partitions of records, each partition dedicated to one processing unit for index creation, wherein the step of determining comprises sampling the database table of records to determine an approximate distribution of at least one key value in the records;

accessing the table records in parallel, wherein each processing unit accesses each of the records, wherein the step of accessing occurs after the step of determining;

filtering the accessed records in parallel, wherein each processing unit determines which records to keep. . . .

Finally, independent claim 24 recites, *inter alia*,

a sampling module that samples the table of data records to determine sub-index delimiters, wherein the sub-index delimiters are used as partition delimiters separating the table into non-overlapping portions of records. . . .

For the forgoing reasons, neither Gupta nor Blank, alone or in combination, teach all of the limitations of independent claims 1, 14, 18, 20, and 24 and therefore cannot anticipate the present invention as claimed. Claims 1, 14, 18, 20, and 24 are allowable over the references of record and should be allowed. All other claims, *i.e.*, claims 2-13, 15-17, 19, 21-23, and 25-26 depend from one of the allowable independent claims and are, thus, also allowable over the prior art of record. Therefore, Applicants respectfully request that the Examiner issue a notice of allowance, for all claims, at his earliest convenience.

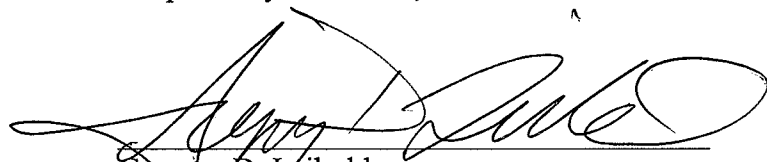
Conclusion

This Amendment fully responds to the Office Action mailed on June 28, 2007. Still, that Office Action may contain arguments and rejections that are not directly addressed by this Amendment due to the fact that they are rendered moot in light of the preceding arguments in favor of patentability. Hence, failure of this Amendment to directly address an argument raised in the Office Action should not be taken as an indication that the Applicants believe the argument has merit. Furthermore, the claims of the present application may include other elements, not discussed in this Amendment, which are not shown, taught, or otherwise suggested by the art of record. Accordingly, the preceding arguments in favor of patentability are advanced without prejudice to other bases of patentability.

It is believed that no further fees are due with this Response. However, the Commissioner is hereby authorized to charge any deficiencies or credit any overpayment with respect to this patent application to deposit account number 13-2725.

In light of the above remarks and amendments, it is believed that the application is now in condition for allowance, and such action is respectfully requested. Should any additional issues need to be resolved, the Examiner is respectfully requested to telephone the undersigned to attempt to resolve those issues.

Respectfully submitted,



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